

# Investigating the Influence of Instructional Materials on the Academic Performance of Secondary School Students in Mathematics.

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## ABSTRACT

Instructional materials play a vital role in teaching and learning objectives especially in technical subjects. This study investigated the Instructional Materials on the Academic Performance of Secondary School Students of Public and Private Secondary Schools in Mathematics in Ikenne Local Government Area of Ogun State and how it affects learning outcomes. A total of twelve public secondary schools and thirteen private secondary schools in Ikenne local government were investigated. The research hypothesis states that there is no significant relationship between types of instructional materials available for use and students' academic performance in mathematics in public. The study found out that most instructional materials used in teaching and learning mathematics are available in most of the private secondary schools and the students are satisfied with how the instructional materials are used in teaching them but were not visibly available in public secondary schools. The analysis revealed that the students in public secondary are not satisfied with the availability of instructional materials and how the instructional materials are used. The study recommends that mathematics teachers should endeavor to use improvised instructional materials for effective teaching of mathematics in public secondary schools where these instructional materials are not available to ensure that teaching and learning of mathematics is seamless. Also, Government and school proprietors should ensure that adequate employment of committed and qualified mathematics teachers are available to teach the subject in all secondary schools.

**Keywords:** Instructional materials, mathematics, academic performance, supplement resources, learning activities.

## BACKGROUND OF THE STUDY

Instructional materials are resources that are used to organize and support instruction, such as textbooks, tasks and supplement resources. They are materials and facilities that can be used to ease, encourage, improve and promote teaching and learning activities.

Instructional materials serve as a channel between the teacher and the students in delivering instructions. They also serve as the motivation on the teaching-learning process. Instructional material is use to get the attention of the students and eliminate boredom. Teachers rely on instructional materials in every aspect of

teaching. They need material for background information on the subject they are teaching; they are a broad range of resource which can be used to facilitate effective instruction.

Amadioha (2018) sees instructional materials as a channel of communication that a classroom teacher can utilize to build a solid concept during the teaching and learning process. That suggests the instructional materials constitute the most channel through which information content passes between a sender and a receiver. According to Koko (2016), instructional materials are any materials and tools that provide opportunities for the teachers and learners to enjoy the meaningful and interesting classroom. This implies that any objects, tools, instruments, materials, visual or non-visual developed and used by a teacher or student- made materials which ease, encourage, improve and promote teaching and learning activities. (Koko, 2016; Okwo, 2000).

### **Statement of the problem**

The poor performance of the students in external examinations in Nigeria is of great concern to the government as well as parents. It has been observed that the huge investment on education is not yielding the desired results (Adebule, 2004). The teachers also complained of students' low performance at both internal and external examinations (Ashiaka, 2010). The annual Senior School Certificate Examinations results showed the general poor performance of students in mathematics. The WASSCE mathematics results of 9,396,442 students who sat for May/June WASSCE from 2010-2015 were collected from the test development division, West African Examination Council (WAEC) Lagos, Nigeria as cited by Zalmon and Wonu (2017). The result revealed that mathematics performance in Nigeria has been persistently poor over the years, as less than 50% of the candidates passed at credit. The mean percentage of students in Nigeria who obtained (A1- C6) is 37.02% while mean percentage of students in Nigeria who had (D7-F9) is 62.95 % in the May/June WASSCE in general mathematics. The results indicated students' abysmal performance in mathematics. Therefore, this revealed that if the pattern of observed performance in May/June WASSCE general mathematics in Nigeria from 2010-2015 is maintained, the percentage of students who would pass mathematics at credit level continued to drop and the failure rate continued to increase over time. Then realizing sustainable development in Nigeria will be difficult.

This general observable trends of students' performance in May/June WASSCE mathematics in Nigeria from 2010-2015 is in agreement with the trend which is also less than 50% credit pass and above as confirmed by WAEC and other researchers (Adeiza, 2011 & Azuka, 2012 as in Musa & Dauda, 2014). The yearly arrival of West African Senior Secondary Certificate Examination (WASSCE) Mathematics by West African Examination Council (WAEC) demonstrates the hazardous nature and general poor performance of Secondary School students in Mathematics. Students' poor performance in internal and public examinations in mathematics have been attributed to teachers' methods of teaching, students' attitudes, unavailability of learning materials, etc. (National Mathematical Centre, 2009). Also, the obsolete teaching methods and inadequate use of instructional materials in the teaching of mathematics have also been identified as the main reasons for poor performance in public examinations.

Thus, this study is carried out to investigate the effect of poor Instructional Materials on the Academic Performance of Secondary School Students of Public and Private Secondary Schools in Mathematics in Ikenne Local Government Area of Ogun State from 2017 to 2021.

### **Purpose of the Study**

The purpose of this study is to investigate the Instructional Materials on the Academic Performance of Secondary School Students of Public and Private Secondary Schools in Mathematics in Ikenne Local Government Area of Ogun State. The specific objective is to identify the types of instructional materials available for use to influence the academic performance of mathematics students of public secondary

schools and private secondary schools.

### Research Question

The following research question was raised to guide the conduct of the study:

What is the type of instructional materials available for use to influence the academic performance of mathematics students of public secondary schools and private secondary schools in Ikenne local government of Ogun state?

### Research Hypotheses

- **Ho<sub>1</sub>**: There is no significant relationship between types of instructional materials available for use and students' academic performance in mathematics in public secondary schools and private secondary schools in Ikenne local government of Ogun State.

## EMPIRICAL STUDIES

Emmanuel, Asuquo Edoho et al (2020) carried out a research titled "Effect of Instructional Materials on Students' Academic Performance in Mathematics in Calabar Municipality Local Government Area of Cross River State, Nigeria". One research question was posed and one hypothesis formulated to guide the study. This hypothesis was tested at 0.05 level of significance. The quasi experimental design was adopted for the study. The sample consisted of one hundred and ninety (190) SSI students selected from six (6) sampled schools. The instrument used for data collection was the Mathematics Achievement Test (MAT). The independent t-test statistics was used for the analysis of the hypothesis, and the research findings showed that teaching with instructional materials has a significant effect on students' academic performance in mathematics.

Oni, Leah Olubunmi et al (2019) carried out a research titled "Use of instructional materials for teaching mathematics in Junior Secondary Schools". The study investigated the extent of the use of instructional materials for teaching mathematics in junior secondary school in Ido Local Government Area, Ibadan, Oyo State. Four research questions were posed to guide the study. The study adopted descriptive survey design. Simple random sampling technique was used to select 6 secondary schools. The same sampling technique was adopted to select 30 students from each school and 6 teachers from the 6 schools. Three instruments were developed with the reliability coefficient values of 0.75, 0.71 and 0.76 respectively. The data obtained were analyzed using descriptive statistics and Pearson's product- moment correlation. The results revealed that text books, writing materials, chalkboard and mathematical sets are available in all the schools. The results also show the mean score and standard deviation of the level of utilization of materials. ( $X=27.7$ ,  $S.D=1.84$ ) and students achievement in mathematics ( $X=61.33$ ,  $S.D=14.83$ ). There was a positive correlation between the two variables ( $r=.23$ ,  $p<.05$ ). It was found that the more the teachers make use of instructional materials, the better the performance of the students in mathematics was enhanced

Michael et al (2012), researched on "Effect of Teachers' Instructional Strategy Pattern in Senior Secondary School Students' Performance in Mathematics word Problem in Ondo, Nigeria". In the study, a total number of one hundred and twenty- five (125) senior secondary school two students were purposively sampled from two schools in Ondo town of Ondo State, Nigeria. The research type was quasi-experimental involving a  $2 \times 3$  factorial design. The dependent variable is student performance on the test items administered while the independent variables were instructional strategy pattern and the scoring levels (high, medium and low scores). Two hypotheses were formulated and tested using Analysis of Covariance (ANCOVA). Findings from the study showed that the experimental group exposed to instructional strategy pattern performed significantly better in mathematics word problem- solving involving simultaneous equations than their

counterparts in the control group. Based on the findings, it is recommended among others that teachers of mathematics should adopt the use of instructional strategy pattern in teaching mathematics in secondary schools.

### Types of Instructional Materials

According to Ellington, Henry, instructional materials can be group into the following categories.

**1. Printed and duplicated materials:** These comprise all textual and other materials that can be run off in large numbers on a duplicator or printing machine for use by students and they have become one of the most basic and widely used of all educational tools. The important type is listed below.

- i. Textbooks: these are books containing a comprehensive compilation of content in a branch of study with the intention of explaining it.

**2. Non-projected display materials:** As its name suggests, this category includes all visual display materials that can be shown to a class, small group or individual student without the use of an optical or electronic projector of any sort. It includes a number of the most basic and most useful visual aids that are available to teachers and lecturers, some of the more important of which are listed below.

- i. Marker board (whiteboard).
- ii. Magnetic board.
- iii. Flipcharts
- iv. Charts and wall charts
- v. Models
- vi. Posters
- vii. Realia

**3. Audio materials:** This category includes all the various systems whereby straightforward audio signals can be played to a class or group or listened to by an individual. It includes a number of extremely useful instructional aids, the most important of audio material is described below.

Radio broadcasts.

### Instructional Materials Used in the Teaching of Mathematics

Instructional materials that are used in the teaching of mathematics are textbooks, writing materials, chalkboard/ whiteboard, mathematical set, construction/ drawing instrument, measuring tape/ ruler, chart, cardboard, graph sheet, graph board, shapes, concrete objects, computer, projector, journal, magazine, handbook. Some of these instructional materials are discussed below:

#### Charts

Charts are defined as materials which communicates facts and ideas clearly and through a combination of drawing, words and pictures. Charts represent information that can be in the form of a diagram, table or graph. The instruction values of chart materials lies generally in their capacity to focus attention and to convey certain types of information in condensed and summarized form. These materials teach fact and also relate ideas. Charts are easily obtained and attract attention. Charts aid the understanding of concepts. Charts also helps to clarify function and relationship that are difficult to explain in words. Some of the charts that are being employed in the classroom situation are line charts, bar charts, histogram, pie charts etc. but if the representation is not bold enough, a convectional class size may find it difficult to see it.

## **Journal, Magazines and Handbooks**

These are the printed materials that can be effectively used to aid mathematics teaching. Experienced mathematics teachers can use them to obtain new formulae of solving mathematics problems which cannot be found in ordinary textbooks and also help teachers to update themselves in mathematics. When these are achieved by the teacher, he will be able to disseminate the knowledge gained to the students. This assists effective teaching and learning in mathematics.

## **Whiteboard**

Whiteboard is a board, white surface, often attached to a wall, on which the teacher can write and draw using special pens (markers). Whiteboard is a glossy, usually white surface for making non-permanent markings. According to Margaret R. (2005), whiteboard is a non-electric variation of the traditional "rewriteable" schoolroom blackboard, but is white instead of black and of a material that can be written on with coloured markers (known as dry erase markers). Dry erase markers are easier to erase than the chalk used on a blackboard.

## **POPULATION OF THE STUDY**

The population of this study comprises all the twelve (12) public secondary schools and all the thirteen (13) private secondary schools in Ikenne local government. Two public secondary schools namely Mayflower School (Senior), Ikenne Remo and Ilisan High School, Ilisan Remo and two private secondary schools namely Dee Unique College, Ilisan Remo and O & A Academy, Ikenne Remo in Ikenne Local Government are randomly selected. The population targeted for this study will be teachers and students in the above mentioned schools.

## **Sampling Technique**

A simple random sampling technique was used in selecting the schools. Two public secondary schools were randomly selected from the list of public secondary schools and two private secondary schools from the list of private secondary schools were also randomly selected. Twenty five respondents (students) were taken from each school while four respondents (mathematics teachers) were taken from each school.

## **RESEARCH DESIGN**

The descriptive survey research design was used for the study.

## **Research Questions**

The following research questions were raised to guide the conduct of the study:

What are the types of instructional materials available for use to influence the academic performance of mathematics students of public secondary schools and private secondary schools in Ikenne local government of Ogun state?

## **Research Hypotheses**

**Ho<sub>1</sub>**: There is no significant relationship between types of instructional materials available for use and students' academic performance in mathematics in public secondary schools and private secondary schools



in Ikenne local government of Ogun State.

### Research Question

What are the types of instructional materials available for use to influence the academic performance of mathematics students of public secondary schools and private secondary schools in Ikenne local government of Ogun State?

This research question was answered and presented in table 1 and table 2

Table 1 type of instructional materials available on academic performance of mathematics students of public secondary schools in Ikenne local government of Ogun State

S/N	ITEMS	A	NA
1.	Textbooks	10(18.5%)	44(81.5%)
2.	Charts / Diagram	12(23%)	42(77%)
3.	Cardboard	10(18.5%)	44(81.5%)
4.	Graph Sheet	20(37%)	34(63%)
5.	Shape	12(22.2%)	42(77.7%)
6.	Concrete Objects	10(18.5%)	44(81.5%)
7.	Mathematics Set	5(9.3%)	49(90.7%)
8.	Chalkboard / Whiteboard	54(100%)	

Source: Fieldwork 2022

Table 1 above reveals that 10 (18.5%) of the respondents agreed that textbooks are available while 44 (81.5%) of the respondents disagreed that textbooks are not available, 12 (23%) of the respondents agreed that Charts / Diagram are available and 42 (77%) of the respondents disagreed. 10 (18.5%) of the respondents agreed that cardboard are available and 44 (81.5%) of the respondents disagreed. 20 (37%) of the respondents agreed that Graph Sheet are available and 34 (63%) of the respondent disagreed. 12 (22.2%) of the respondents agreed that shape are available and 42 (77.7%) of the respondents disagreed. 10 (18.5%) of the respondents agreed that concrete objects are available and 44 (81.5%) of the respondents disagreed. 49 (90.7%) of the respondents agreed that mathematics set are available and 5 (9.3%) of the respondents disagreed and 54 (100%) of the respondents agreed that chalkboard/whiteboards are available which means that all respondents agreed that chalkboard/ whiteboards are available.

Table 2: Chi-square result of instructional materials and academic performance of public secondary schools in mathematics in Ikenne local government of Ogun State

Variables	Df	L.S	Calc $x^2$	Crit $x^2$	p. value	Remarks
Instructional materials and academic performance of public secondary schools in mathematics in Ikenne local government of Ogun State.	4	0.05	32.06	27.30	0.02	$H_0$ Rejected

(Calc  $x^2=32.06 > \text{crit } x^2=27.30$ , DF=4,  $p < 0.05$ )

Table 2 indicates that the calculated chi-square ( $x^2$ ) value of 32.06 is greater than critical chi-square ( $x^2$ ) values of 27.30, with degree of freedom of 4 at level of significance of 0.05. Also, the p-value of 0.02 is less than 0.05. This implies that null hypothesis which stipulated that instructional Materials has no significant

impact on the academic performance of public secondary schools in mathematics in Ikenne local government of Ogun State is to this end rejected. Therefore, instructional materials have a significant impact on the academic performance of public secondary schools in mathematics in Ikenne local government of Ogun State.

**H<sub>01</sub>**: There are no significant relationship between strategies that teachers use to minimize the challenges of accessing and using instructional materials

Table 3: Chi-square result of strategies that teachers use to minimize the challenges of accessing and using instructional materials

Variables	Df	L.S	Calc x <sup>2</sup>	Crit x <sup>2</sup>	p. value	Remarks
Strategies that teachers use to minimize the challenges of accessing and using instructional materials	4	0.05	33.12	30.46	0.02	H <sub>0</sub> 4 Rejected

(Calc x<sup>2</sup>=33.12>crit x<sup>2</sup>=30.46, DF=4, p<0.05)

Table 3 indicates that the calculated chi-square (x<sup>2</sup>) value of 33.12 is greater than critical chi-square (x<sup>2</sup>) values of 30.46, with degree of freedom of 4 at level of significance of 0.05. Also, the p-value of 0.02 is less than 0.05. This implies that null hypothesis which stipulated that there are no significant relationships between strategies that teachers use to minimize the challenges of accessing and using instructional materials schools in mathematics in Ikenne local government of Ogun State is to this end rejected. Therefore, there are no significant relationship between strategies that teachers use to minimize the challenges of accessing and using instructional materials.

## FINDINGS

Based on the analysis of data the following findings emerged:

Most instructional materials used in teaching and learning mathematics are available in most of the private secondary schools and the students are satisfied with how the instructional materials are used in teaching them. The analysis revealed that the students in public secondary are not satisfied with the availability of instructional materials and how the instructional materials are used. The analysis revealed that teachers in both the public secondary school and private secondary schools make use of textbook, which is the most common instructional materials that teacher used to disseminate information.

It was deduced from the result that lack of funds to purchase instructional material, and overpopulation of students hindered effective use of instructional materials during Mathematics teaching and learning in most of the public secondary school in Ikenne Local Government Area of Ogun State.

The study recommended that the mathematics teachers should endeavor to use improvised instructional materials for effective teaching of mathematics in both public and private secondary schools. Government and school proprietors should ensure that adequate employment of committed and qualified mathematics teachers are available to teach the subject in all secondary schools.

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